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MEDICAL NEWS LETTER

Vol. 41

Friday, 3 May 1963

No. 9

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Change of Address

Please forward changes of address for the News Letter to: Commanding Officer U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

Observations on Periodic Disorders *

Erik Ask-Upmark MD. *Acta Medica Scandinavica* 173: 165-175, Feb '63.

Periodic occurrence of symptoms of various diseases has been known for centuries (the attacks of malaria), and Hodgkin called attention to the cyclic appearance of certain symptoms in the disorder that rightly carries his name. Murchison, in 1870, described the periodic fever that may occur in Hodgkin's disease, an observation which in the literature has been unjustly ascribed to Pel and to Ebstein. René Mach of Switzerland, in 1940, described the intermenstrual syndrome. Reimann of Philadelphia, in 1948, assembled a series of cyclic disorders under the name of periodic disease, and has in subsequent papers furnished valuable contributions to knowledge on this subject. This article reports some hitherto unpublished observations to suggest a formerly unknown treatment for intermittent hydrops of the joints, and to give a brief survey of the present knowledge of periodic disorders.

Cyclic periodicity, so characteristic of numerous physiologic phenomena—pulse, temperature, respiration, blood pressure, liver activities, and others—is repeatedly encountered in the clinic. If the discussion be confined to rhythms of one year and less, the following examples may be given:

The Year

The well-known seasonal incidence of peptic ulcer in early spring and in the autumn, the sinus-curve of cardiac mortality with its maximum in Scandinavian latitudes in February and its minimum in August, the pains of generalized bone diseases with their zenith in the late winter and early spring and their amelioration during the summer, the predilection for the spring of tetany, of asthma, and of conjunctivitis aestivalis, the peculiar maximum of the suicides in May are all phenomena familiar to the clinician.

The Month

In females the hormonal tides connected with ovulation and menstruation are reflected in the behavior of numerous disorders.

- a. The premenstrual mental irritability is a well-known phenomenon. For relief, women may turn to overeating, to cigarettes, or even to alcohol—one of the writer's patients used alcohol regularly during the week preceding menstruation, otherwise she was a teetotaler. In reviewing the author's material of intoxications, such as barbiturates, his young colleagues, Bernadotte af Wisborg and Schuback, tried to find out whether suicides and attempted suicides presented any correlation to the menstrual cycle, the inference being that an increased frequency would be expected during the premenstrual period. Owing to deficient recorded information, they were not able to pass judgment on this point. Some years later, British authors

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were able to point out the lethal hazards of the luteal phase of the menstrual cycle, such as suicides and accidents.

- b. Several disorders of the nervous system likewise present an exacerbation in the premenstrual phase, an amelioration after the onset of the menstruation. Such is the case with many instances of migraine, with myasthenia gravis, multiple sclerosis, meningiomas, arteriovenous aneurysms in the head, subarachnoid hemorrhages, the peculiar syndrome of Takayasu's "pulseless disease," and with carotid sinus syncope.
- c. Numerous skin disorders, such as seborrhea, psoriasis, and herpes simplex are apt to present an exacerbation in the premenstrual phase. The same may be the case with various allergic affections of the skin as well as with bronchial asthma and, notably, also with rheumatoid arthritis, conditions incidentally which almost always tend to improve during pregnancy. The mother of one of the author's cases seems to be instructive in this regard: her hydrops articularis intermittens was absent during her four pregnancies.
- d. Usually there is retention of fluid during the premenstrual phase, as easily discerned from impressions on the skin of the face made by laces of the pillow. This observation tallies well with the decreased volume of urine produced prior to menstruation and the increased flow after its onset. Occasionally, this retention may lead to monthly attacks of pulmonary edema, particularly if there is a mitral stenosis about: The author witnessed this sequence of events in some instructive instances. A more atypical type of edema, to be compared with the Quincke-type, is represented by a case described. Paroxysmal tachycardia, being an equivalent of migraine, has the same predilection for the premenstrual phase of the cycle as has migraine itself. Among other similar equivalents of migraine may be mentioned the so-called acute abdominal distention ("bloating syndrome" of the Americans). In 1945, the writer described a young girl whose waist during the premenstrual phase increased from 65 to 96 cm, giving her each month the appearance of advanced pregnancy; this enlargement of the abdomen was to be elicited by a meal. Arterial hypertension and its coronary sequences may present exacerbations in the premenstrual phase, as may also the appearance of extrasystolic beats. Acrocyanosis as well as digits mortis are always worst prior to menstruation and tend to improve after its onset.
- e. The well-known alterations of body temperature during the menstrual cycle may be recalled. In Addison's disease, an exacerbation of the symptoms is likely to occur prior to menstruation, and similarly in the so-called menstruation-tetany which rather should be termed premenstrual tetany. The behavior of the eosinophil leucocytes during the monthly cycle has been analyzed by Davis and Hulit. There is some evidence that the excretion of citric acid may vary during the monthly cycle and that these variations are of importance for the appearance of recurrent concrements in the urinary tract.

- f. From the digestive tract the most striking monthly periodicity seems to be constipation in young women which is almost always more pronounced in the premenstrual week.
- g. Skin pigmentation has close correlations to the phases of the menstrual cycle in that there is always a darkening of the skin in the premenstrual week. The writer has observed young girls who with astonishing regularity got one pigmental mole with each menstruation: during the period there was local itching which was scratched. The mole appeared, reddish, in the scratched area immediately before the onset of menstruation and darkened rapidly.
- h. Cyclic sciatica, due to endometriosis affecting the sciatic nerve and closely related to the menstrual periods have recently been described by Head and collaborators from the Mayo Clinic.

The Week

External conditions pertaining to the week underlie the accumulation of motor accidents to the weekend, the "Monday head" experienced by workers in factories producing nitroglycerine, the "brass-malaria" of zinc fever which formerly was a common disease in Upsala (fever starting with its peak on Monday afternoon and eventually subsiding during the week), and the respiratory reactions sometimes described as occurring Mondays in byssinosis.

There is, however, also a "biologic week" which is not related to the calendar. In days gone by, before the introduction of chemotherapy and antibiotics, the spontaneous crisis in lobar pneumonia occurred on the 7th or 9th day. Drug fever usually appears after 7 to 10 days and the same interval is to be noted in serum sickness. In pernicious anemia, the increase of the reticulocytes in response to treatment tends to occur after 6 to 7 days. Bee stings may unexpectedly show a severe reaction 7 to 8 days after the accident. If a person with gout is operated upon for some disorder (for instance, by means of a cholecystectomy) an attack of gout is apt to appear about 5 to 7 days after surgical intervention; similar attacks of gout may occur with the same interval after coronary infarction.

In glomerulonephritis, the renal reaction is apt to occur 7 to 10 days after the angina tonsillaris, and the same holds for the joint affliction in rheumatic fever, although the interval here is slightly longer. In infectious diseases, the period of incubation may vary between less than 3 days, as in scarlet fever, to 3 months or more in inoculation hepatitis. However, if all periods of incubation are plotted in a diagram, the maximal density of the points will be found around 7 to 10 days. The production of antibodies and the reaction between antigen and antibody obviously has a rhythm of its own. In periodic fever caused by malignant tumors, such as the Ewing sarcomas or the carcinosis ossium in prostatic carcinomas, the periods of fever will usually be 5 to 10 days with an interval of corresponding duration. The Murchison fever in Hodgkin's disease has a similar rhythm, although the cycle is usually somewhat longer (about 3 weeks between the onset of one period of fever to the onset

of the next bout of pyrexia). The regular periodicity of hydrops articularis intermittens has, as a rule, 10 to 11 days as its cycle. In a most instructive case of Cushing's disease in a woman previously deprived of her ovaries, Birke and collaborators found a regular periodicity in the excretion of 17-ketogenic steroids in the urine with a maximum to be noted about every 10th to 12th day.

The Day

The well-known physiologic variations during the 24-hour cycle are to be observed in most biologic functions, such as temperature, heart rate and blood pressure, sleep, respiration, and various glandular activities. Investigations of Forsgren on the rhythmic function of the liver may be quoted as an example: by night the assimilatory functions prevail, by day the dissimilatory (bile production). "Le courage à deux heures du matin" was rightly identified by Napoleon and the predilection of suicides for the early morning hours is familiar to every physician. The vulture picking on the liver of Prometheus every night is perhaps the earliest reference to a 24-hour rhythm in connection with human disease, if the pains in the bones of Job by night are excepted. The predilection for the night is particularly outstanding in various diseases characterized by paroxysmal attacks. Gout, epilepsy, asthma, pulmonary edema, pains in the bones in generalized disorders of the bone system are some of several examples.

Although no attempt is made to explain the periodicity of all the disorders here exemplified, certain points may be mentioned with a bearing on conditions, such as hydrops articularis intermittens, paroxysmal auricular fibrillation, and periodic fever in certain tumors of the bone system (Ewing sarcomas, carcinosis).

1. The condition may be due to some autoimmunity reaction, being self perpetuated in much the same way as a chronic glomerulonephritis, acquired hemolytic anemia, or a Hashimoto goiter.

The author's attempt, so far successful, to break the vicious circle in the hydrops articularis intermittens, by injecting the intra-articular fluid intramuscularly, perhaps lends some support to this theory. Another suggestive piece of evidence may be the frequent occurrence of a traumatic injury to the joint, initiating the history of a hydrops articularis intermittens: this injury may play the same role in such a case as the surgical intervention so frequently heralding the appearance of Hashimoto. In this connection, the reaction of patients with gout may be referred to—surgical interventions, or pathologic necroses such as cardiac infarctions, may initiate an attack—and a similar explanation has also, in previous papers of the writer, been given for the appearance of Duplay's syndrome in connection with necrosis of the tissue—as in cardiac infarctions, but also in burns and in cerebral infarction.

2. The accumulation of a substance produced by the body or by tissue involved, so as to trigger a reaction when it has reached a certain level, is another interpretation. In 1942, Bramwell and King, in their *Principles and Practice of Cardiology*, referred to the repeated attacks of auricular fibrillation

as follows: "The way in which these paroxysms recur at more or less regular intervals, even in otherwise healthy subjects, is suggestive of some biochemical cumulative process which automatically explodes when it reaches a certain stage of its development, and then starts to reaccumulate preparatory to another paroxysm." As for the nature of this substance, it may be some antibody or other compound, perhaps hormonal in character (the etiocholanolone fever of Bondy). The monthly periodicity connected with menstruation is at least suggestive in this regard, and the periodic excessive production of hydrocortisone described by Hokfelt et al in a case of pituitary tumor, as well as the periodic variations in the excretion of the 17-HO-ketosteroids reported by Birke et al represent additional evidence.

3. A central regulation of rhythmic phenomena is tempting to assume. However, this does not necessarily concern the centrencephalic structures, but perhaps hormonal impulses (as exemplified by the premenstrual disorders) or a rhythm of the reticuloendothelial system of its own, a rhythm where perhaps the antibody production and the antigen-antibody response may be involved, and which may have correlations to the endocrine system as well. The well-known influence of cortisone on the antibody-antigen response and the periodicity occasionally to be noted in hydrocortisone production may fit into the pattern of reticuloendothelial response. The same may hold for the peculiar lymphocytopenia in the adrenocortical syndrome of Cushing: the importance of the lymphocytes and their reticular mother-cells for antibody formation has recently been discussed in an editorial in the Journal of the American Medical Association (180: 1052, 1962).

* * * * *

Ticks (Ixodoidea) on Birds Migrating from Africa to Europe and Asia*

Harry Hoogstraal (1), Makram N. Kaiser (1), Melvin A. Traylor (2), Sobhy Gaber (1), and Ezzat Guindy (1).

The role of northward migrating birds in long distance and large scale transport of immature stages of the African tick, Hyalomma marginatum rufipes Koch, 1844, has epidemiologic implications requiring further study in a number of disciplines and geographical areas. Southward migrating birds play a similar part in carrying the European-Asiatic tick, Hyalomma marginatum marginatum Koch, 1844, into Africa (Hoogstraal and Kaiser, 1961).

Incidental specimens and established populations of both subspecies of H. marginatum, as well as of other tick species, have on a number of occasions been reported far from the boundaries of their endemic range. In certain areas of northern Africa and western Asia, taxonomically confusing specimens of H. marginatum suggest interbreeding between these subspecies. Where endemic, both these ticks are vectors of human and animal diseases.

The ability of numerous tick species to transmit or harbor for long periods a variety of pathogenic organisms, especially viruses and rickettsiae, causes them to be suspect as reservoirs of disease causing organisms wherever they are found. The ability of certain viruses normally transmitted by mosquitoes to adapt to ticks, a definite though insufficiently studied phenomenon, further increases these suspicions, as does the still unexplained, sudden appearance of explosive severe outbreaks of "new" tick-borne diseases, such as Kyasanur Forest disease in Mysore, India. Birds are the chief or incidental vertebrate reservoirs of a variety of viruses and rickettsiae pathogenic to man and other mammals, and isolation of certain of these pathogens from exotic foci frequently raises the question whether migrating birds, with or without ticks, have been the agents of introduction. The paucity of study on viruses in ticks and the frequency with which these arthropods are found infected when examined suggest a rich field for research.

This report on ticks taken in Egypt from birds migrating from tropical Africa to Europe and Asia is a continuation of a preliminary investigation (Hoogstraal and Kaiser, 1958) which included data obtained during the spring passages of 1955, 1956, and 1957. In this review, additional records for 1958 through 1960 are presented, and previous data are briefly summarized. The numbers and kinds of uninfested birds examined are recorded for the 1960 migration period only. Ticks collected from southward autumn migrants are reported elsewhere (Hoogstraal and Kaiser, 1961). All birds were taken in Cairo, Giza, or Faiyum Provinces of Egypt unless otherwise noted.

Materials and Methods

Materials and methods used in these studies were described by Hoogstraal and Kaiser (1958). Owing to difficulties of field identification, the species of a number of uninfested birds could not be recorded before 1960. Numerous passage birds, especially those infested by ticks, were prepared as study skins and sent to the Chicago Natural History Museum for identification. By 1960, knowledge of local migrants was sufficiently advanced to permit accurate field identification of virtually all specimens. It has been possible, therefore, to include quantitative data for both infested and uninfested birds obtained during 1960. In recent years, mist nets, in addition to previously reported baited nooses, were used to trap birds. Uninfested birds were released after examination. During 1959 and 1960, migrant and endemic kestrels were trapped by means of a mouse-baited, noose-lined cage (Berger and Mueller, 1959), which was thrown to the ground whenever one of these birds was watching.

Discussion and Conclusions

Migration Routes and Destinations

Migration routes of a few species, such as the white stork and swallow, can be plotted from returns of birds banded in Europe. Banding of palaearctic migrants on their African wintering grounds has recently begun. Few returns

are thus far available to assist with problems of passage migrants in Egypt. Despite this lack of direct evidence, some claims can be made with relative certainty.

The great volume of birds that descend the Nile Valley in spring and migrate through the Delta have either passed through or wintered in Sudan. A few may have crossed the Sahara from equatorial Africa, but the majority will have followed the Nile flyway from the savannahs of central Sudan. Study of distribution maps of tick host species shows that almost all have been recorded as wintering in at least part of Sudan.

A second area from which migrants flying over Egypt might be expected is East Africa. At least 12 of the 22 tick host forms (species and subspecies) winter in Uganda, Kenya, and northern Tanganyika. There is less assurance that the bulk of East African birds migrate through Egypt during spring. However, it is safe to assume that during the passage north some if not many of those wintering to the south join those returning from Sudan.

Although their actual wintering grounds are unknown, a few birds passing northward through Egypt are representatives of species found as far south as the Cape of Good Hope. Until rings of birds taken on the African continent are reported, precise information on overwintering localities of numerous populations will remain obscure. Summer breeding areas to which

TABLE 1
TICK-INFESTED SPRING MIGRATORY BIRDS IN EGYPT, 1960^a

Bird hosts				Ticks			
Species	No. examined	Infested		Immature <i>Hyalomma</i> spp.	<i>Hyalomma</i> <i>m. rufipes</i> reared	Total ticks	No. ticks per host
		No.	%				
<i>Falco naumanni</i>	21	1	4.8	2	2	4	4.0
<i>Falco t. tinnunculus</i> ^b	42	12	28.6	27	23	50	4.2
<i>Merops superciliosus persicus</i>	13	1	7.7	0	1	1	1.0
<i>Monticola saxatilis</i>	23	4	13.3	8	2	10	2.5
<i>Oenanthe o. oenanthe</i> ^b	270	48	17.8	111	27	138	2.8
<i>Oenanthe isabellina</i>	158	18	11.4	33	7	40	2.2
<i>Oenanthe hispanica melanoleuca</i>	81	14	17.3	18	3	21	1.5
<i>Oenanthe pleschanka cyprica</i>	13	4	30.8	5	2	7	1.8
<i>Phoenicurus p. phoenicurus</i>	53	6	11.3	6	2	8	1.3
<i>Erythropygia g. galactotes</i>	56	11	19.7	25	1	26	2.4
<i>Molacilla a. alba</i>	11	1	10.0	2	0	2	2.0
<i>Anthus c. campestris</i>	35	2	6.3	5	1	6	3.0
<i>Lanius senator niloticus</i>	10	6	60.0	27	7	34	5.6
Total (13 host forms)	786	128		269	78	347	

^a In addition, 173 birds, representing 16 other species, were also examined and found free of ticks.

^b A single larva of *Argas* sp. was also taken.

tick-infested birds were flying when intercepted in Egypt appear to be mostly eastern Europe and western USSR. Some go at least as far as the eastern

shores of the Black Sea, others may travel even farther into the interior of Asia.

Pattern and Period of Migration

Spring migration in Egypt begins during the last few days of February and extends to early May. Samples for the present study were taken from the vast numbers of birds that follow the Nile Valley. That numerous migrants fly

IXODID TICKS ON MIGRATING BIRDS IN EGYPT

TABLE 2
TICK-INFESTED SPRING MIGRATORY BIRDS IN EGYPT, 1956-60

Bird host species	No. hosts, 1956-60	Hyalomma m. rufipes reared to adults		Immature Hyalomma sp. ^a	Other tick species	Total ticks	No. ticks per host
		♂♂	♀♀				
<i>Circus macrourus</i>	1	2	1	0	0	3	3.0
<i>Falco naumanni</i>	3	0	2	2	0	4	1.3
<i>Falco t. tinnunculus</i>	42	32	33	29	$\begin{matrix} 3^b \\ 1^c \end{matrix}$	98	2.3
<i>Coturnix c. coturnix</i>	1	2	3	0	0	5	5.0
<i>Streptopelia turtur</i> subsp.	3	0	0	3	0	3	1.0
<i>Merops superciliosus persicus</i>	1	0	1	0	0	1	1.0
<i>Calandrella cinerea brachydactyla</i>	1	0	2	0	0	2	2.0
<i>Monticola saxatilis</i>	11	4	12	8	0	24	2.2
<i>Oenanthe o. oenanthe</i>	103	46	61	231	1 ^c	339	3.3
<i>Oenanthe isabellina</i>	88	70	77	126	2 ^d	275	3.1
<i>Oenanthe hispanica melanoleuca</i>	28	12	9	121	0	142	5.0
<i>Oenanthe pleschanka cyprica</i>	6	3	2	5	0	10	1.7
<i>Phoenicurus p. phoenicurus</i>	13	7	4	6	0	17	1.3
<i>Erythropygia g. galactotes</i>	20	7	12	29	0	48	2.4
<i>Phylloscopus sibilatrix</i>	1	0	0	1	0	1	1.0
<i>Motacilla a. alba</i>	1	0	0	2	0	2	2.0
<i>Motacilla flava feldegg</i>	1	0	0	2	0	2	2.0
<i>Anthus c. campestris</i>	5	3	1	5	0	9	1.8
<i>Lanius nubicus</i>	1	1	0	0	0	1	1.0
<i>Lanius s. senator</i>	2	1	1	0	0	2	1.0
<i>Lanius senator niloticus</i>	7	5	4	27	0	36	5.1
<i>Lanius s. senator</i> ≥ <i>niloticus</i>	1	1	0	0	0	1	1.0
Total (22 host forms)	340	196	225	597	7	1 025	

^a Probably *Hyalomma marginatum rufipes*.

^b *Rhipicephalus s. sanguineus*.

^c *Argas* sp.

^d *Hyalomma impellatum*.

northward over the Sahara, tarry a bit on the coast, and then take off over the ocean is shown by the great numbers seen resting on the narrow littoral desert fringe of the Mediterranean across the entire breadth of Egypt. Few of these latter birds have thus far been studied. Species and destinations of birds traveling to the east and west of the Nile probably differ from those

overflying cultivated areas of Egypt. The rate of northward migration is poorly known, although it is thought to be somewhat more leisurely than in autumn. Some bird species leaving northern Egypt fly to eastern Europe or Asia directly over water in a day or two, usually utilizing favorable oceanic winds. Others fly into Asia via Sinai and eastward.

Life-Cycle of *H. Marginatum Rufipes*

Hyalomma marginatum rufipes appears to act as a two-host tick when its immature stages parasitize birds. Adults are usually found on larger domestic animals. Larvae and nymphs remain on avian hosts for at least 2 weeks and sometimes as long as 6 weeks or more (Hoogstraal, 1956). It seems likely that many attached larvae or nymphs have been carried to Europe and Asia by migrating birds, and that this agency is, therefore, responsible for rufipes specimens having been found in Eurasia.

Distribution and Ecology of *H. Marginatum Rufipes*

The normal geographic range of *H. marginatum rufipes* is the Ethiopian Faunal Region, including the highlands of southwestern Arabia and scattered localities in the Nile Valley of Egypt. Egyptian populations are morphologically much more variable than are those of tropical Africa. Most Egyptian samples are easily distinguishable from those from further south in Africa.

Although the minimum temperature tolerance of rufipes has not been studied, Theiler (1956) reports it from South African highlands where 120 days of frost appear annually. Temperature alone does not appear to be a restrictive factor in rufipes distribution, since this tick also commonly occurs in semiarid regions of Africa and in savannahs with a long hot severe dry season. In areas with over 30 inches (about 760 mm) of annual rainfall, semitropical zones, humid seacoasts, and other zones with high relative humidity in spite of low annual rainfall, rufipes is less common or absent.

Areas of the USSR from which rufipes has been reported (reviewed by Hoogstraal 1956) are the western desert of Transcaucasia and mountain pastures (but not valleys) of western Tadzhikistan. Transcaucasian populations may have been established through the agency of birds traveling up the Nile flyway. Tadzhik populations may have been introduced by birds flying from South or East Africa over Arabia or the Arabian Sea to the Middle East and thence northward into the USSR.

Tick Infestation of Spring Migrants

During the 1960 spring migration period, 959 northward migrating birds representing 29 species were examined. Data from infested species are summarized in Table 1. (Uninfested species and the number of each examined are also shown.) One hundred and seventy-three birds representing 16 species, were free of ticks. One hundred and twenty-eight birds out of 786, representing 13 species, bore 349 ticks. Two of these ticks were larval Argas species; 347 were Hyalomma larvae and nymphs, from which 78 adults of *H. marginatum rufipes* were reared. The remaining ticks all appear to be rufipes.

Hyalomma ticks are invariably found in, around, or near the ears of their host. With the exception of Argas and Haemaphysalis spp., which may attach anywhere on the host; most other ticks also attach to the head and it is seldom necessary to search elsewhere on the body. Argas ticks were found incidentally during the present study. Almost the only way to survey accurately for argasid ticks is to pluck all feathers—a technic not utilized in this study.

If a captive host dies before nymphs have completed feeding, this developmental stage often dies. If, however, sufficient blood has been imbibed to permit the nymph to moult to the adult stage, resulting males and females are frequently dwarfs that may be difficult to identify. Vigorous, well formed adult ticks develop only from nymphs that have fully fed—a process usually intensely accelerated some hours before detaching from the host.

Medical Importance of H. Marginatum Rufipes

Hyalomma m. rufipes has been found infected with Rickettsia (Dermacentro-
xenus) conorii, the causative organism of boutonneuse fever or tick typhus, in southern Africa. It seems probable that most species of ixodid ticks are capable of transmitting the causative Rickettsia (Gear, 1954). This disease which is related to Rocky Mountain spotted fever of the American continent is widely distributed in Africa from the Cape to the Mediterranean. It also occurs in southern Europe as far north as Romania, Crimea, Israel, and in the North-West Frontier Province and Kumaon Hills of India. Coincidentally, this distributional outline conforms closely to that of the Hyalomma marginatum complex. In the laboratories of the U. S. Naval Medical Research Unit, No. 3 in Cairo, H. marginatum rufipes has also been found naturally infected with Rickettsia burnetii, the causative organism of Q fever which is now known in many parts of the world. Reiss-Gutfreund (1956) reported isolation of Rickettsia prowazekii from H. Marginatum rufipes in Ethiopia. H. marginatum rufipes and allied subspecies are definitely deserving of further virologic and rickettsiologic investigation. Some reasons for this statement are briefly reviewed in the introduction to the present report. The nominate form which is H. m. marginatum Koch, 1844 (= H. p. plumbeum Panzer, 1795, of Russian workers), is the vector of the virus causing Crimean hemorrhagic fever, and has been associated, in nature and experimentally, as a vector or reservoir of a number of pathogens causing human and animal diseases.

* From Research Report MR 005.09-1402.03, Bureau of Medicine and Surgery, U. S. Navy Department, Washington, D. C., USA. The opinions expressed in this report are those of the authors and are not to be construed as official or as reflecting the views of the U. S. Navy Department or the naval service at large.

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* * * * *

Deaths from Coronary Heart Disease in Persons
Fifty Years of Age and Younger

Cedric R. Bainton MD, and Donald R. Peterson MD MPH, Seattle, Wash.
New England Journal of Medicine 268:569-575, March 14, 1963.

Data for this descriptive epidemiologic study were obtained by interrogation of the next of kin (occasionally others) of all patients with confirmed fatal coronary heart disease who could be identified from an entire community in persons fifty years of age and younger, during a 12-month period in King County, Washington.

One hundred and twenty-two men and 11 women were studied in detail. Among the men, death occurred within one hour of onset in 63% and within 24 hours in 85%. Forty-one percent of those dying within 24 hours of onset had had no symptoms or signs of disease referable to the cardiovascular system. Only 23% lived long enough to be medically attended, however briefly, during their last illness. Possible inciting circumstances were reported in only 16%.

Fewer were engaged in professional-managerial occupations than expected from census tabulations or other studies of coronary heart disease. The popular conception of the person prone to coronary heart disease as a tense, driving, ambitious person in a position of responsibility could not be corroborated from the aggregate data of this study. Instead, the data suggest that the study subjects were, if anything, an indolent, hypokinetic group.

Ten of the men and 3 of the women had frank alcoholism. Another 23 males habitually consumed 30 ounces or more of whiskey or its equivalent per week, thus belying the prophylactic value of alcohol in coronary heart disease.

Of the 11 women in the group, most had no predisposing disease, and 9 were experiencing regular menses at the time of their first infarction; ovarian tissue was found at postmortem examination in 2 women who had had hysterectomy.

The rate of death from coronary heart disease seems to have stabilized for those 50 years old and younger in the face of a continuing decline in the rate of death from all causes. This is a cogent reminder of the need for knowledge that can be applied toward prevention of this disease.

* * * * *

Shellfish Sanitation Research Centers

The Public Health Service is building two shellfish sanitation research centers, one at Narragansett Bay, R.I., and the other at Mobile Bay, Ala. Both are expected to be in operation by the summer of 1963. The Rhode Island center, located at Kingston, will provide northeastern States with technical assistance, specialized training, and research in shellfish sanitation. The Alabama center will be at Dauphine Island, near Mobile, and will provide research and technical assistance to the Gulf Coast States.

Radioisotopes in Tropical Medicine

WHO Chronicle, Vol. 17, No. 3, March 1963.

The general place and usefulness of radioactive isotopes in medical and biologic research are now well established. Through the labeling of compounds involved in living processes, metabolic cycles of greater or lesser complexity may now be more fully elucidated than was hitherto possible. Broadly speaking, two methods are employed. In the dilution method, the size of the body pool of a given component—such as fat, water, or protein—is gauged by noting the extent to which a labeled substance becomes diluted within the body, the assumption being that it is uniformly distributed. In the turnover method, the rate of particular metabolic processes is deduced from the rate of appearance of breakdown products containing the radioactive tag attached to the original substance under investigation.

Interpretation of data obtained from dilution studies is often difficult because they represent the outcome of many interrelated physiologic factors; transport, distribution, and homeostasis are functions of many organs. It may be necessary to employ a computer to evaluate the data obtained from even relatively simple systems. Again, dilution methods tend to give rather a static picture of body composition. Fortunately, they are complemented by information obtained from turnover studies which yield the fraction of an exchangeable pool lost by excretion or other means in a standard period. Thus, by using tracer doses of the long-lived isotope of sodium ^{22}Na and estimating total body radioactivity at successive intervals, it can be shown that the whole of the sodium in the exchangeable pool is replaced from dietary intake over some 14 days. A similar approach can be used to study iron turnover and iron loss in anemia.

In such research it is theoretically desirable that the isotopes of any element should be indistinguishable from one another and from naturally occurring forms as far as the receptive or manipulative biologic system is concerned. It is also desirable that, if there are naturally occurring elements of isotope complexity, their composition should be constant. These desiderata are not always satisfied. Thus, the rates of metabolism of carbon in plant photosynthesis differ appreciably in atmospheres of $^{14}\text{CO}_2$ and $^{12}\text{CO}_2$. Again, it is desirable to introduce the tracer chosen into the biologic system under survey in concentrations allowing an accurate estimate in the final materials; and this depends on the half-life of the isotope, its dilution in the tissues, and their threshold for radiation damage.

Further, in labeling a particular molecule, the label must not become separated from the parent compound during its metabolism, i. e., the tracer must label the molecule at a point stable for the purposes of the experiment. Thus, tritium (^3H) is unsuitable for tagging hydroxyl or amino groups because it may be lost by direct exchange. The labeled material must be introduced into the biologic system by the most appropriate pathway and equilibrated, suitable fractions being subsequently isolated for radioactive assay.

In tropical medicine, four phenomena appear over and over again in varied combination: infection, diarrhea, malnutrition, and anemia. Infection and malnutrition interact particularly closely. The problems of tropical disease do not differ greatly from those of disease in general except in so far as they must be investigated against the background of the phenomena just mentioned and under particular climatic conditions. Nor does the use of radioactive isotopes in the elucidation of these problems differ basically from their application in more general fields. Metabolism (above all, the metabolism of water and electrolytes, and of proteins), the anemias, and the parasitoses and protozoal diseases are the main subjects of investigation. Isotopic methods may also be applied to the study of the biology—including the biologic control—of parasites themselves and of their vectors. These and other questions were discussed at a Symposium on the Use of Radioisotopes in the Study of Endemic and Tropical Diseases that was convened jointly by the International Atomic Energy Agency (IAEA) and WHO in Bangkok in December 1960 and whose proceedings have recently been published. (1) The Symposium brought together experts in tropical medicine and experts in the medical uses of radioisotopes to review the present position of isotope research problems still outstanding in the tropical field where isotope methods might fruitfully be applied. The main scope of these methods has already been indicated. There are also more limited applications. The ability to locate an isotope-labeled package, and so to detect transfers and transport, makes it possible to follow the flow of body fluids and the movements of intestinal contents or of parasites within the body.

Water and Electrolyte Metabolism (2, 3)

The water-electrolyte balance of the body is a dynamic one. The situation at any given time is determined by intake, absorption, adjustment of the extra- and intracellular fluid compartments, and excretion by the kidneys, gut, and other organs. These factors are influenced by the stresses of adaptation to heat and humidity or aridity, and of many kinds of disease process. It is hardly necessary to emphasize the importance of disturbances in the metabolism of water and salts under conditions of tropical heat and excessive sweating, or in the dehydrated state induced by cholera or the more chronic diarrheal diseases. These disturbances affect the ability to work and survive of both the indigenous inhabitants and visitors from temperate zones. Radioactive isotopes have

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1. Radioisotopes in tropical medicine. Proceedings of the . . . , Bangkok, 12 - 16 December 1960, Vienna, International Atomic Energy Agency. In subsequent footnotes, this publication will be referred to as Radioisotopes in tropical medicine. Inquiries concerning this publication should be addressed to: Publications Section, Division of Scientific and Technical Information IAEA, Vienna 1, Austria.
 2. Maegraith, B.G. & Leithhead, C.S. (1962) In: Radioisotopes in tropical medicine, p 181.
 3. Veall, N. (1962) In: Radioisotopes in tropical medicine, p 197.

already proved their value in the study of these conditions and will become more valuable as technics improve.

Excessive loss of water and salts occurs via the intestinal tract in diarrheal disorders, while retention of fluid or electrolytes occurs in edematous states resulting from malnutrition or malarial nephrosis. The balance between water and electrolytes and their differential distribution in body compartments also help to determine the host's response to infection. For practical purposes, the main subjects of concern here are water, sodium, potassium, and chloride. The process of absorption of water and salts from the normal bowel is in many ways obscure, particularly so in the presence of cholera, *Salmonella* or *Shigella* infection, or diarrhea resulting from heat stress or dietary changes. It may well prove that the diarrheal episodes occurring in heatstroke or experienced by visitors to the tropics are the outcome of alteration in fluid resorption induced by local circulatory changes in the gut. Heavy sweating is harmful if the water and salt losses are not replaced as they occur, since deficiency of either may cause a form of heat exhaustion; severe depletion from sweating without replacement may cause a syndrome in some ways resembling cholera. Very little is known about the differences between tropical and temperate residents in this respect. Effects of environmental heat on water-electrolyte balance offer a unique opportunity for isotope studies.

Isotope technics have proved invaluable in studies of every aspect of water and electrolyte physiology, the most useful methods so far being based on the dilution principle, a principle by no means new in this connection, since plasma volume was first measured with indicator dyes half a century ago and the first isotopic estimation of body water, using deuterium (^2H), followed only 15 years later. But there is an important difference between volume dilution and chemical dilution, the latter giving estimates of the sizes of exchangeable pools of body electrolytes. ^{24}Na , ^{42}K , and ^{82}Br (used as a chloride substitute) and deuterium or tritium are the isotopes most often employed in such studies. It is a basic assumption of the dilution technic that the indicator substance becomes uniformly distributed throughout the pool to be measured; and since, in fact, open systems are involved, it is practical to allow 24 hours for equilibration in measuring the exchangeable pool in the case of electrolytes. Some early results of studies with a new isotope, ^{28}Mg , suggest that the correction of magnesium depletion in cholera is an essential prerequisite to the correction of potassium loss.

Fortunately, most of the isotopes used in studies of body composition (except tritium) emit radiations both easy to detect and easily measurable, and have such brief half-lives (some of only a few hours) as to minimize the radiation hazards. This may create supply difficulties where field research centers are remote from primary sources, in view of the heavy cost of freighting lead containers by air; but it may prove possible to ship the isotopes in relatively unshielded wing-tip containers.

(To be continued)

MISCELLANY

NEW DEPARTMENT OF DEFENSE DISEASE AND INJURY CODES

CAPT George W. Russell MC USN
Head of Surgery Branch, Professional Division, BuMed

On 1 July 1963, the Navy, Army, and Air Force will, by concurrent actions, implement the provisions of Department of Defense INSTRUCTION 6040.33. This instruction prescribes a uniform nomenclature and statistical classification for recording and reporting of diagnoses for all patients treated, in, or accounted for by, all military medical establishments. The implementation of this instruction will provide for the adoption of the Department of Defense Disease and Injury Codes (DDDIC) as the basic reference for all coding of diagnoses and, at a later date, of all surgical procedures. The Joint Armed Forces Statistical Classification and Basic Diagnostic Nomenclature of Diseases and Injuries, NAVMED P-1294 (JAF), will be rescinded on the effective date except that Sections V and VI thereof pertaining to surgical operations will be retained in use until such time as they are superseded by Part 7 of DDDIC. The Joint Armed Forces Nomenclature and Method of Recording Psychiatric Conditions, NAVMED P-1303, will also be rescinded.

Reasons for Change

JAF was originally consistent with the early editions of the International Statistical Classification of Diseases published by the World Health Organization (ISC). However, the latter has been so extensively revised that whole categories of diseases have been changed and it is no longer possible to use the JAF to develop morbidity and mortality statistics which can be compared with those developed by users of recent editions of ISC. Most of the civilized world uses the ISC and this has been an important consideration requiring the adoption of a classification of diseases consistent with it. However, ISC being merely a detailed categorization of disorders does not in itself supply a suitable nomenclature of morbid conditions. Such a nomenclature is provided by The Standard Nomenclature of Diseases and Operations (SND), 5th Edition, published by the Blakiston Division of McGraw Hill Book Company, Inc.

Description of DDDIC

In accordance with instructions outlined in DOD INSTRUCTION 6040.33, DDDIC has been developed as a tri-service effort. The principal parts (Parts 1-5) will be published and issued for use starting 1 July 1963. In its completed form the

DDDIC will consist of eight parts which will be described and which are listed as follows:

- Part 1 Diagnosis Nomenclature and Statistical Classification
 (MISC)
- Part 2 Body Parts - Statistical Classification
- Part 3 Diagnosis Nomenclature - Alphabetic Index
- Part 4 Body Parts - Alphabetic Index
- Part 5 Body Part Diagnosis Codes
- Part 6 External Causes of Injury
- Part 7 Surgical Operations and Special Procedures -
 Classification and Index
- Part 8 Histologic Classification of Neoplasms

Part 1 of DDDIC is essentially a fitting of SND terminology into the category system of the ISC. Certain modifications in the ISC within permissible limits were made to accommodate the special needs of the military services. These modifications were limited to the addition or new fourth digit rubrics or the further subdivision of existing fourth digit rubrics. In some cases, category titles were modified to agree with SND. The result has been the military adaptation of the International Statistical Classification (MISC). The subdivisions of MISC may in every case be recombined to form categories identical with those of the original ISC. Then all diagnostic nomenclature terms from SND were included under the appropriate MISC rubrics. The results become Part 1 of the DDDIC.

The diagnosis terms (inclusion terms) were then alphabetized and published with their respective code numbers. This becomes Part 3 of the DDDIC.

Certain diagnoses, e. g., Arthritis, acute, 7200, call for a supplementary body part code. Part 2 is a numerical classification of body parts and Part 4 is an alphabetic list of body parts with their respective code numbers.

Part 5 of DDDIC provides tables for arriving at the correct complete 4-digit diagnosis number in the cases of a number of diagnoses where the MISC number depends upon the body part involved. These tables have served the purpose of greatly reducing the bulk of Parts 1 and 3. These tables will not have to be used at those coding activities possessing computers. These tables will greatly facilitate the utilization of the codes by coding personnel but will normally be of little concern to others.

Part 6 of DDDIC will be published at a later date as an up-to-date classification and index of external causes of injury.

In the case of surgical operations, the medical officer for a time will continue to use JAF (Parts V and VI) for terminology and coders will use JAF for assigning surgical procedure code numbers. At a later date, an up-to-date classification and index of surgical operations and special procedures will be published as Part 7 of DDDIC and this will completely obviate the further use of JAF.

A recognized disadvantage to MISC is that, in conformity with the ISC, neoplasms are for the most part classified arbitrarily by anatomical

location rather than by any cytological features. This was necessary to insure the broad objective of the classification of universal comparability. To correct this disadvantage, it is planned to publish a uniform Histologic Classification of Neoplasms as Part 8. This will be a tri-service project which will supplement the MISC code and afford a greater degree of utility in the indexing, cross referencing, and scientific study of clinical neoplasms, especially in tumor board and registry procedures.

Application

Except for occasional reference purposes the medical officer will not directly use the DDDIC. When closing out clinical records the medical officer will be expected to use diagnostic terminology consistent with good practice. In other words, terminology from SND will generally be used. In some cases of small ships and mobile units medical officers and corpsmen on independent duty may use terminology contained in the small volume, Current Medical Terminology (CMT) published by the American Medical Association. Medical officers will no longer be required to code the clinical record by number. Records of diagnoses after being recorded by the medical officer (or independent corpsman) will be forwarded to certain designated data processing centers (certain U. S. Naval Hospitals and other designated activities) where medical record librarians and coding personnel will, utilizing DDDIC, assign appropriate code numbers.

The DDDIC will contain detailed instructions to medical record coders for the use of its various parts in the coding operation. Inasmuch as the vast majority of diagnoses to be coded will be SND terms indexed in Part 3 of DDDIC, coding can, after 1 July 1963, be accomplished by relatively inexperienced personnel with brief instructions.

Need for the DDDIC

The Navy has the obligation under existing treaty arrangements with other nations (NATO) to utilize a statistical classification consistent with ISC. MISC (Part 1 of DDDIC) meets this requirement and thus assures statistical comparability of morbidity and mortality statistics with those of these country's armed services, with the U. S. Air Force, and U. S. Army, and in fact with health agencies worldwide. Use of MISC also furnishes a very adequate tool for the indexing and filing of medical records and their retrieval when desired. Often, MISC will be helpful in establishing categories for inclusion in special scientific studies. It is true, however, that it will not always be a suitable tool for clinical research in specialty areas. MISC, having as a primary purpose broad statistical comparability, must be distinguished from the most modern and sophisticated classifications developed for themselves by the various respective professional societies. Societies and medical centers have in the past furnished appropriate detailed classifications suitable for study and research in particular specialties. It is interesting to note, however, that these classifications have generally been too controversial and variable from year to year and from center to center, to be incorporated in the MISC which has a need for

stability, comparability, and broad application. Further, professional society classifications cut across each other with numerous inconsistencies, the resolutions of which would be practically impossible. Parts 1 and 3 of DDDIC can be easily revised to retain consistency with further revisions of the parent ISC or with future editions of SND.

Nomenclature

Effective 1 July 1963, the medical officer will be expected to use the diagnostic nomenclature as prescribed for the armed forces contained within pages 103 to 510 of SND (5th Edition). These pages contain a list of acceptable diagnostic terms. Also contained are special instructions to the medical officer, such as "Specific site and organism when known." Such specification amplifies the diagnoses and is necessary for proper coding of diagnoses and a resulting proper statistical classification. The medical officer should remember that the "supplementary terms" beginning on page 483 of SND are generally not proper diagnoses. The alphabetic list contained in SND, pages 611-814, is often sufficient to indicate whether or not a given diagnosis term is acceptable. However, reference to the main section of SND is usually necessary in order to determine whether amplification of the term is required. In general, (with an occasional exception) if a diagnosis term is in the book, it is acceptable. The various code numbers appearing with diagnosis terms on the pages of SND are not to be used. The use of the volume, Current Medical Terminology, 1963, published by the American Medical Association as a source for medical terms will be authorized for independent duty medical corpsmen and, in some cases, medical officers aboard small ships and attached to mobile field units. Here again, the numbers appearing after the diagnosis terms should not be recorded as they are at variance with the MISC numbers in many cases.

BUMED INSTRUCTION 6820.4G provides for acquisition by medical facilities under the technical control of BuMed of appropriate numbers of volumes of the Standard Nomenclature of Diseases and Operations, Fifth Edition, and/or Current Medical Terminology, 1963. It is suggested that these volumes be obtained in authorized numbers in anticipation of adoption of the DDDIC. The various parts of the latter volume will be distributed by the Bureau of Medicine and Surgery.

Definition of Terms

DDDIC.....	Department of Defense Disease and Injury Codes
JAF.....	Joint Armed Forces Statistical Classification and Basic Diagnostic Nomenclature, NAVMED P-1294
ISC.....	International Statistical Classification of Diseases and Injuries
MISC.....	Military Adaptation of ISC
SND.....	Standard Nomenclature of Diseases and Operations
CMT	Current Medical Terminology

A forthcoming BuMed Instruction will promulgate the above information.

FROM THE NOTE BOOK

Articles Desired for Journal of Environmental Health. Mr. Nicholas Pohlit RS MPH, Executive Secretary, National Association of Sanitarians, University of Denver, Denver 10, Colorado, would like to receive original or research reports or articles suitable for publication in the Journal of Environmental Health. This periodical is the official journal of the National Association of Sanitarians, and is primarily designed for the advancement and dissemination of knowledge in all the broad aspects of environmental health.

While it is recognized that a sound program in sanitation is important to the military at all times, it is doubly so (or more) under situations likely to prevail in natural or in man-made disasters of war or peace. —Editor

American Board CertificationsAmerican Board of Pathology

Certified in Clinical and in Anatomical Pathology

LCDR Thomas C. Hartney MC USN

American Board of Radiology

LCDR Gerald F. Dobel MC USN

LCDR Donald R. Lintner MC USN

LT John R. Corbett MC USN

LT Rex Orr MC USN

LT Joseph L. Sirois Jr, MC USN

Marine Sergeants Build Device to Aid Infants. The ingenuity of two Marine sergeants in Iwakuni, Japan has given prematurely born infants a better chance for survival when being transported by air in incubators. Gunnery Sgt Tom Kelly and SSgt Michael Mendoza devised a system to convert the power supply of the KC-130F Hercules to the necessary voltage required to operate a heater in portable incubators.

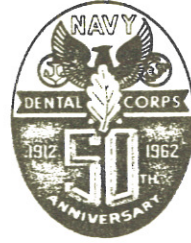
The 28-volt DC system of the Hercules was converted to the standard 115-volt, 60-cycle current. Using two standard aircraft converters, the two sergeants modified a pallet using two alternate switches which change the transformers every 30 minutes to allow the proper amount of power flow to the incubator. Castors were attached to the pallet to make it portable, and foam rubber added for the incubator to rest on, making the ride smoother. In addition, a light was attached to the rig to allow constant observation by the medical officer on flights of this nature.

This invention provides a rapidly portable unit which is virtually fool-proof—a factor of the utmost importance in transporting premature infants.

—Armed Forces Press Service, April 7 1963

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DENTAL



SECTION

Necrotic Ulcerative Gingivitis

Charles F. Sumner, III, Major, DC, USA,* and Paul N. Baer, DDS,**
Bethesda, Md. Oral Surg 14(11):1391-1393, November, 1961.

This article is concerned with the use of a periodontal dressing as part of the treatment of the acute phase of necrotizing ulcerative gingivitis. It is particularly suitable for specialized populations, such as soldiers in the field, where the unique circumstances of their environment make adequate home care impossible. The periodontal dressing also affords distinct benefit for civilian patients for whom adequate home care is difficult or impossible.

Superficial debridement of the necrotic marginal tissues is done gently with a curette, and the coronal portions of the teeth are polished with a rubber cup and pumice. We have found the Cavitron to be effective for removing the superficial debris, but it is not yet practical for field use.

The gingiva is covered with a periodontal dressing much like that which is applied following gingival surgery. The use of surgical dressing in this treatment is not entirely original with us; while the usual eugenol-zinc oxide dressings are effective, we find the zinc bacitracin-hydrogenated fat dressing most desirable.

The patient is then dismissed for 4 to 5 days and may return to duty immediately. No other home care, such as the use of mouthwashes, is needed. Although we have not found it necessary to administer an antibiotic systemically, such supportive therapy is at the discretion of the treating dentist.

The patient returns on the fourth or fifth day and the dressing is removed. At this stage the gingivae are improved in appearance, although not completely healed. Following the removal of the dressing, curettage is performed to remove all the calculus and the patient is taught an effective method of oral hygiene. Very rarely is it necessary to replace the dressing for an additional period of time. At the end of this visit, the patient is given an appointment for treatment of any gingival craters which may have formed during the acute phase of the disease as well as for treatment of any underlying chronic periodontal condition. Surgical intervention may be required to restore correct physiologic contours of the gingivae.

*Chief, Periodontia Section, Walter Reed General Hospital, Washington, D.C.

**National Institute of Dental Research, NIH, PHS, U.S. DHEW

Discussion

The periodontal dressing has been used successfully in more than 200 cases of acute necrotizing ulcerative gingivitis. The advantages of using the periodontal dressing in the acute phase of this disease are as follows:

1. The dressing gives immediate and continued relief of pain.
2. Frequent rinsing and other forms of home care, daily application of medications, and cleaning are not necessary during the period that the dressing is in place.
3. The inflamed gingiva is protected from food and local irritants; thus, a better environment for repair is created.

These advantages are particularly important for active troops in the field. Retention of the dressing does present a problem, but it is a problem which can be minimized by careful application and removal of the excess dressing which may interfere with mastication.

Conclusion

A simple, effective, and safe method of using a periodontal dressing as part of the treatment of acute necrotizing gingivitis has been described. This method has been used successfully in more than 200 cases of acute necrotizing ulcerative gingivitis in members of the Armed Forces. It is particularly applicable to situations in which it is difficult to provide proper home care.

* * * * *

Prednisolone Desensitizing Solution

The 1 March 1963 issue of the Medical News Letter, Vol. 41, No. 5, carried an article on the use of prednisolone as a desensitizing solution. This article did not credit the original research in this field nor did it describe the method of application. In answer to numerous inquiries, this additional information is provided.

Arthur E. Fry, D.D.S., of the University of Oregon reported in 1960 the results of using a corticosteroid for the relief of pulpal sensitivity. From this, John H. Mosteller, D.D.S., of Mobile, Alabama, conjectured that this corticosteroid might be used prophylactically to prevent thermal sensitivity, and after clinical tests, reported his findings.

Additional and complete information including techniques of application can be found in:

1. Fry, A. E., Watkins, R. E., Phatak, N. M.: Topical use of Corticosteroids for the Relief of Pain Sensitivity of Dentine and Pulp, Oral Surgery, Oral Medicine, and Oral Pathology 13:594, 1960.
2. John H. Mosteller, D.D.S., Prednisolone for Postoperative Thermal Sensitivity, Journal of Prosthetic Dentistry 12:1176, 1962.

Personnel and Professional NotesNewly Standardized Items Available for Issue.

<u>FSN</u>	<u>Nomenclature</u>	<u>Unit Issue</u>	<u>Unit Price</u>
L6520-687-8250	Bur, Dental, Excavating, Angle Handpiece, Tungsten Carbide, No. 37, 6s	PG	2.50
L6520-720-9665	Bur, Dental, Excavating, Angle Handpiece, Tungsten Carbide, No. 558, 6s	PG	2.60
L6520-721-6288	Bur, Dental, Excavating, Angle Handpiece, Tungsten Carbide, No. 4, 6s	PG	2.50
L6520-817-2645	Pulp, Protector, Dental, Calcium Hydroxide, Paste	TU	1.05
L6520-853-8346	Silver Alloy Pellet, Dental, 400s, 5 oz	PG	6.20
L6520-854-2495	Elevator, Root Cogswell "B"	EA	3.95
L6520-854-2496	Elevator, Root Cogswell "A"	EA	3.95
L6520-854-2953	Wheel, Abrasive, Silicon Carbide Impregnated Rubber, Coarse, Square Edge, 3 by 3/8 inches	EA	.87
L6520-854-3091	Bur, Dental Surgery, Straight Handpiece, Tungsten Carbide, Tapered Fissure, No. 703, 6s	PG	2.70
L7530-890-1015	Envelope, Radiographic Film Mount, Dental, 5-1/2 by 9-1/4 inches, 100s	PG	2.45
L7530-890-1016	Envelope, Radiographic Film Mount, Dental, 3-1/8 by 5-1/2 inches, 100s	PG	1.05

U. S. Naval Dental Corps Continuing Training Program. The short postgraduate course, "Complete Dentures," will be offered 20-24 May 1963 at the U. S. Naval Dental School, Bethesda, Md. Capt J. B. Stoll, DC, USN, will be the instructor. The procedures involved in complete denture prosthetics will be explained in lectures and demonstrations. Emphasis will be placed on the physiology of oral tissues, impression considerations, maxillomandibular relationship records, remounting procedures, and occlusal correction. The class will participate in natural-contour waxing procedures and in the equilibration of dentures.

This short course is open to active duty career dental officers of the Armed Forces in accordance with quotas established by the Bureau of Medicine and Surgery. Quotas have been assigned to ComOne, ComThree, ComFour, ComFive, ComSix, ComNine, PRNC, SRNC, and CNATRA. Applications should be received in the Bureau as early as possible and preferably, not less than

4 weeks prior to commencement of the course. The Bureau Professional Advisory Board will make recommendations on all requests, and upon approval by the Surgeon General, applicants will be notified as to the final action. Those approved will be nominated for TAD or authorization orders, as appropriate. Accounting data will be forwarded to individual officers nominated for TAD orders. Staff Dental Officers not utilizing assigned quotas shall report this information to BUMED, Code 6111, one month prior to the convening date of the course. This will allow the Bureau to fill the quota from other districts.

Rear Admiral R. W. Taylor DC USN Placed on Temporary Disabled Retired List. RAdm Ralph William Taylor DC USN was placed on the Temporary Disabled Retired List of the Navy on 1 March 1963.

Admiral Taylor was born in Lyman, Washington, and received the degree of Doctor of Dental Surgery in 1924 from the University of Southern California, where he later was an instructor in the College of Dentistry.

In 1928, Admiral Taylor was appointed a Lt(jg) in the Naval Dental Corps, and has been on continuous active duty since that time. He has had a varied and colorful naval career, serving in many naval stations throughout the world, as well as on the battleship USS PENNSYLVANIA and the aircraft carrier USS YORKTOWN. Prior to his retirement he served as Director, Naval Dental Activities Field Branch, Bureau of Medicine and Surgery, Pacific Coast, with offices in San Francisco, California.

As an outstanding oral surgeon, Adm Taylor was made a member of a Dental Education Team which was sent to Argentina in 1948 for the purpose of instruction and good will. He presented clinics and gave personal demonstrations in oral surgical methods to members of the dental profession.

Admiral Taylor is a fellow of the American College of Dentists, a diplomate of the American Board of Oral Surgery, and a member of both the American Society of Oral Surgeons and the American Dental Association.

Appointments in the Dental Corps of the U. S. Navy. The candidates listed below have been selected for appointment in the grade of lieutenant commander, Dental Corps, U. S. Navy.

Applegate, Donald E.
Billotte, Alfred C.
Davidson, Richard S.
McLaughlin, Edward J.
Mielke, Dean T.
Showacre, William R., Jr.

The candidates listed below have been selected for appointment in the grade of lieutenant, Dental Corps, U. S. Navy.

Alden, John D., Jr.
Bies, Peter E.

Borchardt, Calvin W.
Brenyo, Michael (n), Jr.

Candidates selected for appointment in the grade of lieutenant (contd.)

Burke, Hugh D.
Camamo, Joseph A.
Ciardello, Carmen A., Jr.
Dupcak, Joseph (n), Jr.
Eckerson, Peter L.
Giordan, Ronald D.
Hansen, Duane A.
Harris, Ronald K.
Hesby, Richard A.
Hodes, Leonard F.
Hoffmann, Robert M.

Jones, Robert P.
Kelly, James C. Jr.
MacPherson, John H.
Mather, John G.
McMahon, Joseph P.
Poidmore, Sam J.
Rudolph, Jerome "J"
Switala, Robert G.
Thibodeau, Richard A.
Vaught, James E.
Vernino, Arthur R.

Navy Dental Officers Appear at Jacksonville Meeting. Each year the Navy Dental Officers of the Northeast Florida area present the professional program at the March meeting of the Jacksonville Dental Society. This year the meeting was held on 20 March.

Capt J. V. Westerman DC USN, Senior Dental Officer, NAS, Jacksonville, and Staff Dental Officer, COMNAB-6 presented the guest speaker, Capt Jerome C. Stoopack DC USN, who discussed "The Complete Oral Examination." Capt Stoopack, a diplomate of the American Board of Oral Surgeons, is Chief of Dental Service at the U. S. Naval Hospital, Jacksonville, Florida.

Helpful professional hints were presented by the Navy Dental Officers with emphasis on "Dental Materials" by Lt Russell Corio and "Conservatism in Class II Amalgam Preparations" by LCdr Gordon E. King.

Mouth Preparation for Complete Dentures. A panel discussion on Mouth Preparation for Complete Dentures was presented to staff, resident and postgraduate dental officers, and civilian and military guests at the U. S. Naval Dental School, Bethesda, Md., on 12 April 1963.

Cdr Frank J. Kratochvil DC USN, Head of the Removable Partial Denture Branch of the Prosthodontics Department of the Naval Dental School was the moderator for this panel. The panelists were Dr. S. Elmer Bear, Chairman of the Department of Oral Surgery of the Medical College of Virginia, and Dr. Joseph P. Cappuccio, on the Graduate Faculty in Oral Surgery and Associate Professor of Oral Surgery and Anesthesiology at the University of Maryland, who presented the Oral Surgeon's views. Capt Robert B. Lytle DC USN, Commanding Officer of the Second Dental Company at Camp LeJeune, North Carolina, and Dr. Dewey H. Bell, Associate Professor and Chairman of the Prosthodontics Department, Medical College of Virginia, School of Dentistry, presented the Prosthodontist's viewpoint.

Each panelist was given 8 to 10 minutes to present his basic views on planning mouth preparation for dentures, emphasizing the exchange of information between the prosthodontist and the surgeon. Following the panel presentation there was a question and answer period.



OCCUPATIONAL MEDICINE

Blunt Trauma Cannot Produce Cancer

Carroll J. Bellis, MS, PhD, MD, Professor and Chairman, Department of Surgery, California College of Medicine, Los Angeles, Calif. *Industr Med Surg* 32(3): 124, March 1963.

The recent number of claims attributing the development of cancer to a previous contusion must be frustrating to the dedicated laboratory workers in cancer studies. Pyramiding numbers of awards by industrial accident commissions to such claimants have increased to tremendous proportions. These judicial decisions have been influenced by some physicians who have testified that cancers, for example, of the breast or of the testis, have been caused by antecedent blunt injury.

There is no cause and effect relationship between an injury and the subsequent development of malignancy. Well-schooled cancerologists and eminent pathologists have stated repeatedly that trauma cannot cause cancer, even if a patient thinks it can, and even if the lesion is in the region of a previous contusion or multiple contusions. A cancer found in such an area is not due to the injury, which merely has called attention to the pre-existing cancer. Development of a cancer in an area of ancient injury is coincidental and not the result of the injury.

Frequently, before a civil court or an industrial accident commission, the claim is made that a cancer has been caused by previous injury at the locus of the tumor. And each time, after drawing upon the knowledge and experience of renowned students of cancer like Adair, Garland, and Wangensteen, and after the writings and the experts have been brought to the hearings, the subject has been closed for a while. The conclusion is reached that the cancer was not due to the injury. Then another unfortunate and misguided patient brings the pot to a new boil, only to have the same decision reached after months of fruitless waste of time, money, and heartache.

When medical students learn the suggested causes of cancer (embryonic rests, pituitary mastotropic hormones, autosomal gene linkage, etc.), trauma is mentioned only to be dismissed without consideration. Trauma as an inciting or aggravating mechanism does not have a place in cancer development, and schooled pathologists do not include injury as a mechanism by which cancer is initiated or stimulated.

There are no "dormant" cancers. Any gross or microscopic inflammation or hemorrhage in a cancer removed from an area of previous injury is due to surgical manipulation, to the nature of the tumor, or to the injury. However, inflammation in the specimen in no sense indicates that injury has caused the malignancy.

The hard-earned gains in knowledge of cancer etiology and cancerogenesis must not be set back by incriminating trauma as a cause or aggravation of a cancer. The induction of a cancer in the skin of a mouse by an irritant is not a proof that a cancer may arise as the result of a contusion, nor are such studies intended to produce such proofs. These experimental cancers in mice are produced for other reasons. When Dr. Maude Slye's strains of female mice with breast cancer beget female progeny every one of which develops a spontaneous breast cancer, it cannot be concluded that cancer is caused by heredity.

Investigators the world over would be dismayed, indeed, were the progress in cancer knowledge vitiated by relating cancer to trauma. The relation is untenable, and an allegation that a cancer has been caused by an injury should be unequivocally denied.

* * * * *

Pharmacology and Toxicology
of 1, 1-Dimethylhydrazine (UDMH)*

Kenneth C. Back and Anthony A. Thomas, Biomedical Laboratory, 6570th Aerospace Medical Research Laboratories, Aerospace Medical Division, Wright-Patterson AFB, Ohio. *Industr Hyg Digest* 24(1): 23-27, Jan-Feb 1963.

UDMH is a missile propellant which has incurred increased usage. The acute intraperitoneal LD₅₀'s in the rat, mouse, dog, and monkey were 104, 132, 60-100, and 60-100 mg/kg, respectively. All animals showed clonic-tonic convulsions, and death was by respiratory arrest. Intravenous injection of 1-50 mg/kg UDMH caused no immediate effect on carotid blood pressure, respiration or EKG of the anesthetized dog. UDMH did not effect the pharmacodynamic activity of acetylcholine, histamine, epinephrine, and norepinephrine, nor did it alter the responses caused by faradic stimulation of the peripheral or central end of the cut vagus.

Unsymmetrical dimethylhydrazine (UDMH) has become increasingly important, from a medical viewpoint, because of its large scale use as a missile propellant. Its reputation as a potentially toxic agent is well documented. Examination of the literature has revealed a great deal of data regarding the inhalation and parenteral toxicology of UDMH but little information on its pharmacodynamic properties. This report concerns the pharmacologic and toxicologic activity of UDMH.

*This does not represent a complete report of the article.

Discussion

The information gathered from this research does not, unfortunately, provide the clues to the mechanism of toxicological activity of UDMH. Nothing in these studies has shown the reason for the long latent period between dosage and the start of central nervous system effects. The mechanism of death, however, has been shown to be respiratory arrest with cardiovascular collapse as a secondary cause. Administration of an acute dose of UDMH appears to produce no discernible manifestations until vomiting and convulsions occur. The primary activity of UDMH is apparently centered in the central nervous system. Recent work by Medina et al has implied that UDMH effects on the CNS are due to an effect on the gamma aminobutyric acid shunt. More specifically, it appears to act as an inhibitor of glutamic acid decarboxylase, which could explain the reason for the long delay in CNS activity even when UDMH is given intravenously. The above-mentioned work and studies by Reeves and Back et al. have further shown that certain Vitamin B₆ analogues can effectively prevent convulsions and death of laboratory animals exposed to lethal doses of UDMH. The mechanism for this protection is not completely understood, but it undoubtedly is related to the action of pyridoxine as a coenzyme to decarboxylase in the gamma aminobutyric acid shunt.

Of practical interest is the finding that UDMH dose-response curves are characterized by very steep slopes. A steep slope combined with an apparent species non-specificity makes it easier for the toxicologist to extrapolate data to possible human toxicity. Additional insight has been provided for use in the transposition of animal data to human tolerance by Reynolds et al., who showed that in monkeys doses of 30 mg/kg UDMH i. p. caused no decrement of performance function in a shock avoidance test program.

The foregoing information coupled with the fact that UDMH is extremely rapidly excreted in the urine offers strong support for the belief that a human being could be exposed to at least 10 mg UDMH/kg without harmful effects.

Summary

The acute LD₅₀ of UDMH in mice, rats, dogs, and monkeys by intraperitoneal administration was found to be 125 mg/kg, 104 mg/kg, 60-100 mg/kg, and 60-100 mg/kg, respectively. All animals exhibited clonic-tonic convulsions as the predominant symptom, and death was via respiratory arrest. Dogs and monkeys routinely showed emesis within 15-60 minutes following a dose of UDMH, regardless of route. In the anesthetized dog UDMH did not alter the effects of epinephrine, norepinephrine, acetylcholine, histamine, or reserpine on blood pressure. It did not significantly affect autonomic ganglia or postganglionic nerve endings, nor did it markedly alter the electrocardiogram or blood pressure in 1-2 hours. In the unanesthetized dog, however, blood pressure was significantly increased until convulsions and respiratory arrest occurred.

Methyl Cellosolve Intoxication*

Mitchell R. Zavon, MD, Kettering Laboratory, University of Cincinnati College of Medicine, Cincinnati 19, Ohio. *Industr Hyg Dig* 24(1): 36-41, Jan-Feb, 1963.

Case histories are presented of 5 persons who suffered from methyl Cellosolve intoxication after an industrial exposure. Signs and symptoms are described and related to previous reports. These cases arose out of increased exposure to methyl Cellosolve without awareness or knowledge of the toxic potential and need for control measures.

The possibility of a misdiagnosis resulting from a failure to gather a complete history is soon learned by the medical student. The industrial physician is particularly aware of the possibility of missing a vital fact in the work history; yet it is possible to have the fact, yet miss its significance. Failure to gather a complete history may not be due to error; it may be due to the lack of availability of such a history.

The cases of illness which are related in this report are the result of gross misuse of a very useful chemical compound. The compound has been used in large quantities, both before and after this episode, without any untoward effects. The illnesses reported resulted both from ignorance of the hazards of a "safe" solvent and from the absence of routine health surveillance in the particular departments involved. The physicians who saw the employees outside the plant could not be aware of all of the materials in use nor could they be aware that the patient seen was one of a group with similar symptoms rather than a patient with a unique illness.

Methyl Cellosolve is ethylene glycol monomethyl ether ($\text{CO}_3\text{OCH}_2\text{CH}_2\text{OH}$). It may also be found indexed as 2-methoxyethanol. It is a colorless liquid which has a rapid rate of evaporation. Its molecular weight is 76.06; specific gravity 0.966; boiling point 124.3 at S. T. P.; vapor pressure 7 mm of Hg at 20° C; and it is completely soluble in water.

Discussion

In January 1956, a solvent, methyl Cellosolve, which had previously been used sparingly in a plastics printing operation began to be used in considerably greater quantity. Its use without precautions to prevent excessive inhalation or cutaneous exposure was accompanied by the development of symptoms of illness among some employees and changes in hemograms among other employees. Resolution of symptoms and reversion of hemograms to normal followed changes in the process which resulted in a marked reduction of exposure to methyl Cellosolve. In retrospect a diagnosis of methyl Cellosolve intoxication was made in all of the cases reported.

* This does not represent a complete report of the article.

This episode is another example of the failure to alert production personnel to the hazards of unrestricted use of a material formerly used in a limited manner. It is also an example of the inability of the practicing physician, unacquainted with production processes and exposures, to diagnose chemical illness when he is faced with a single case of such illness. The plant physician with access to the entire group of individuals at risk may miss the diagnosis. The private practitioner without access to the entire group at risk stands much less chance of making the correct diagnosis except in those instances in which the chemical intoxication is one of those few which are comparatively well known and are discussed in medical school.

The very fact that these cases were seen by different practitioners resulted in a lack of uniformity in the case reports. Despite this lack of uniformity, the details of these cases show many points of similarity, and in conjunction with the information available in the literature, result in a good description of methyl Cellosolve intoxication.

Methyl Cellosolve can be absorbed percutaneously, ingested or inhaled. Exposure to a high concentration by inhalation or percutaneously for a relatively brief period of time will result in manifestations of central nervous system instability including: ataxia, dysarthria, tremor, and somnolence. The hematopoietic system will be affected with depression of red cell formation. However, in acute exposure, the central nervous system effects will be more pronounced. In cases of prolonged exposure to lower concentrations of methyl Cellosolve, the hematopoietic effects seem to be more pronounced than do the central nervous system effects.

Greenburg and colleagues divided their cases into three groups:

- (1) Those showing no neurological or other symptoms but having abnormal hemograms.
- (2) Those having abnormal neurological findings but no complaints.
- (3) Those having both neurological symptoms and complaints.

It is difficult to discriminate between neurological and hematopoietic effects in some cases in which anemia is pronounced, but the differentiation is probably academic anyway since removal from further exposure remains the treatment of choice.

When percutaneous absorption is minimal and atmospheric exposure is 25 ppm or less, there appears to be little hazard from exposure to methyl Cellosolve.

The author has no explanation for the transient exhibition of a positive test for reducing sugar in the urine. Benedict's solution is not reduced by methyl Cellosolve, methoxy acetic acid (principal metabolite of methyl Cellosolve) or Carbitol. Inasmuch as the patient's urine reverted to normal as he recovered from the methyl Cellosolve intoxication there might be some relationship.

The cases described follow in large measure the description of previously reported cases. The finding of dilated ventricles on pneumoencephalography may be without significance. However, it has not been previously reported and the single bone marrow smear is of value in indicating the type of marrow response in the human exposed to methyl Cellosolve.

All of the persons who became ill recovered. There may be some doubt about the complete restoration of a normal sensorium in two instances. However, lack of knowledge of the mental status of the two individuals prior to this illness precludes arrival at any conclusion as to failure of complete recovery.

The effect of Carbitol has not been considered in this investigation. The effect of Carbitol alone or in combination with methyl Cellosolve may be a factor which should not be ignored. However, no statement can be made about its effect or lack of effect in the cases presented.

Conclusions

1. The first cases of methyl Cellosolve intoxication reported in more than 20 years have once again re-emphasized the need for care in handling this solvent.
2. The cases reported are similar to those previously reported, but add a few additional facts resulting from newer diagnostic procedures.
3. Lack of awareness or lack of knowledge of the toxic potential of a material may lead to illness which could be avoided by means of the most elementary hygienic measures.
4. The private practitioner of medicine labors against great odds when he sees a patient with chemical intoxication resulting from on-the-job exposure to a relatively unknown material.

* * * * *

Mercury Deposits on Industrial and Laboratory Floors

Prepared by LCdr Peckham, MSC, USN, and submitted by the Commanding Officer, U. S. Naval Hospital, San Diego, California.

In those laboratories and industries where mercury is used, occasional spillage of the metal allows for its accumulation in floor crevices and other relatively inaccessible areas. Since the density of the liquid is a deterrent to its removal by routine cleaning methods in these areas, the resultant hazard of chronic mercury vapor exposure to personnel is cause for some degree of concern. This problem has been effectively solved in the Clinical Chemistry Laboratory of this hospital by the use of the following procedure.

Zinc metal granules (20 mesh or smaller) are placed in a glass container and momentarily covered with dilute hydrochloric acid (1N) in order to expose oxide-free surfaces of this metal. Following this, the acid is poured off. The zinc granules are then placed in floor crevices and other areas where mercury deposits are noted. Immediate amalgamation of the zinc metal occurs. The zinc is allowed to remain in the areas for a few minutes, however, in order to insure completion of the amalgamation process. The amalgam can now be easily removed by sweeping.

The recognized advantages of the above procedure over that of other known methods of mercury removal are twofold: (1) the amalgam is readily removed by sweeping, and (2) any small amount of mercury not removed by sweeping is in amalgam form and thus exerts a vapor pressure appreciably lower than that of mercury in the pure state.

Zinc metal granules are used to effect amalgamation because of the reasonable cost and ready penetration into crevices.

* * * * *

Activated Charcoal as an Antidote for Poisons

Abstract of papers presented at the fourth annual meeting of the American Association of Poison Control Centers, by L. Emmett Holt, Jr., and Peter H. Holz, Department of Pediatrics, New York University. National Clearing House for Poison Control Centers Bulletin, Jan-Feb 1963, pp. 1-5.

The effectiveness of charcoal as an antidote for poisons has been known for 150 years. It was dramatically demonstrated before the French Academy in Paris in 1830 by Tonery who swallowed a highly lethal dose of strychnine mixed with charcoal and "never turned a hair."

Activated charcoal is the most powerful adsorbing agent known. It has a broad spectrum of activity being effective against virtually all poisons—organic and inorganic substances, large and small molecules, the one notable exception being cyanide. Its action is practically instantaneous and it retains the material adsorbed with great tenacity, organic solvents usually being required to effect elution. Quantitative data on the adsorption of many poisons may be found in a series of studies carried out in the Pharmacological Institute of Copenhagen by A. H. Anderson (Acta Pharm. et Tox. Vols 2, 3, and 4, 1946, 1947, and 1948).

The application of charcoal as a first aid measure consists in stirring the charcoal in water until the consistency of a thick soup is obtained; this is then used for lavage, a final washing being left in the stomach. The process is "messy," nurses' uniforms tend to become spotted and nurses need to be indoctrinated as to the value of the procedure. The type of charcoal is important. Of the many products available, the authors have had favorable experiences with the following: Nuchar C (West Virginia Pulp and Paper Co.), Darco G60 (Atlas) and Norit A (American Norit Co.). Bone chars are not suitable.

The writers express the opinion that the most suitable prophylactic for household poisoning in children would be a bottle of charcoal on every household medicine shelf.

Activated Charcoal

Presentation of the above summary of papers by Dr. L. Emmett Holt, Jr., and Dr. Peter H. Holz at the American Association of Poison Control Centers meeting in November has stimulated renewed interest in the use of activated

charcoal for acute poisonings. Information in the articles referred to above from the Pharmacological Institute of Copenhagen was considered worthy of summarizing for the information of physicians treating acute poisonings.

The adsorbent qualities of charcoal probably were first described in 1791 and its effectiveness attested to in 1834 in a biochloride of mercury ingestion. However, in 1830 a French pharmacist ingested a dose of strychnine—several times the lethal dose—together with 15 grams of charcoal and had no ill effects.

In order to evaluate the potential effectiveness of charcoal for other substances, Anderson summarized his findings in the following table.

Amount of Substance Adsorbed by 1 g Carbo med. Merck

Mercuric chloride	1800
Sulfanilamide	1000
Strychnine nitrate	950
Morphine hydrochloride	800
Atropine sulfate	700
Nicotine	700
Barbital ("Veronal")	700
Barbital-sodium ("Medinal")	150
Phenobarbital-sodium ("Luminal")	300---350
Alurate-sodium	
Dial-sodium ("Dial")	
Evipal-sodium	
Phanodorn-calcium	
Salicylic acid	550
Phenol	400
Alcohol	300
Potassium cyanide	35

It was noted that different charcoal preparations varied in their adsorptive capacities by as much as 100%. For this reason, it is necessary to examine the type of activated charcoal that one uses. The rate of adsorption was of interest since in vitro the equilibrium was found to be reached within one minute for 90% of the substances concerned.

In another article by the same author, the pH adsorption capacity of charcoal was investigated. The conclusions were: (1) Weak bases are more effectively adsorbed at an alkaline reaction (2) Weak acids are best adsorbed in an acid reaction (3) Ampholytes are best adsorbed at the isoelectric point (4) The adsorption of electroneutral substances are unaffected by changes in pH and (5) Weakly dissociated metallic salts are adsorbed least at a strongly acid reaction, where the formation of complex ions is favored. The practical implication from these conclusions is that when treating a poisoning, the quantity of charcoal used should be large enough to bind the entire quantity of poison, even at a pH which would be most unfavorable to the adsorption.

In a third article, there is a series of experiments to determine the adsorption capacity of charcoal in vivo. Using rabbits he compared the adsorption of allylpropynal and allylpropynal together with activated charcoal using the depth of narcosis as measured by the corneal reflex as a determinant of absorbed allylpropynal. Since it lacks measureable blood levels this type of study cannot be definitive since the strong possibility exists that the depth of narcosis is affected by the absorption of the allylpropynal via a slow release in the gastrointestinal tract producing a prolonged but decreased systemic effect. However, the author concluded on the basis of the experiments in vitro, as well as in vivo, that adsorption in vivo is about one half that in vitro.

NOTE: The renaissance of these experiments calls for a new evaluation of activated charcoal in the treatment of accidental ingestions as well as suicide attempts. Some investigation might be done to conclude its usefulness as a first-aid measure and in poisonings where there is no definitive treatment. It is the belief of this office that consideration should be given to the use of activated charcoal alone without the addition of other substances which may impede its efficiency or contribute to the misnomer of "universal antidote."

—Occupational Health Division, BUMED.

* * * * *

Hydrogen Sulfide Gas

Submitted by W. T. Marr, Industrial Hygienist, Long Beach Naval Shipyard, Long Beach, California, for the Occupational Health Hazards Release No. 35, October-December 1962.

Some of our employees often work in areas containing decayed organic material. Hydrogen sulfide gas, with the characteristic odor of rotten eggs, is evolved during this decay process. This gas is extremely poisonous even in very small quantities. It is irritating to the eyes, nose, and throat, and can cause pulmonary edema. In high concentrations the gas causes a rapid loss of the sense of smell. When absorbed through the lungs it affects the central nervous system, leading to unconsciousness and death. Hydrogen sulfide has a very distinctive odor in low concentrations which gives warning of its presence. After prolonged exposure, however, the sense of smell becomes fatigued. If the concentrations should increase due to inadequate ventilation, the gas would not be recognized by odor. The maximum allowable concentration of hydrogen sulfide is 20 parts per million for an 8-hour per day exposure. One hundred ppm causes eye and respiratory tract irritation after one hour exposure. Two hundred ppm causes eye irritation in a few minutes, and lung injury after one hour of exposure. Five hundred ppm results in severe irritation of the eyes and respiratory tract, with serious injury to the lungs after 15 minutes exposure. Hydrogen sulfide is heavier than air, therefore, displaces air in low areas. Where there is a high concentration of this gas,

chemical-fume respirators are of no value; self-contained, air-supply, or air-line respirators equipped with full face pieces must be used.

* * * * *

Compressed-Air System for Respirable Air

Submitted by Mr. A. V. Munton, Industrial Hygienist, Portsmouth Naval Shipyard, Portsmouth, New Hampshire for the Occupational Health Hazards Release No. 35, October-December 1962.

The quality of compressed air from plant systems is frequently questioned as a source of respirable air. At this shipyard, use of the compressed-air system is permitted for all air-supplied respirators and for shallow diving. For other diving operations, water-pumped air is required. At frequent intervals, tests for carbon monoxide have been made on air from the system, but none has ever been detected. Although there have never been any complaints about odor or oil, filters are required on the respirator manifolds. During periods of freezing weather, ethyl alcohol is introduced to prevent freezing of condensate; routine analysis is made of the air to assure concentrations of less than 200 ppm.

The possibility of carbon monoxide contamination in air from internally lubricated high-pressure compressors is always considered. Design features in this system have filtered air drawn into the compressors from intakes positioned away from any source of air contamination; two-stage pumps have intercoolers between stages, as well as aftercoolers, industrial scrubbers, and air receivers, all trapped for moisture condensate and oil. The temperature of the compressors is carefully controlled to below 300° F by the intercoolers and protected against any increase by a fusible plug. At regular intervals during operation, temperature readings at the compressors are made and recorded, with temperature generally in the range 200° to 250° F. Operating temperature is the most important factor in possible carbon monoxide production, and is considered to be adequately controlled to provide air of good quality.

* * * * *

Pica (the eating of nonedibles) is a recurring condition in half of the children hospitalized for accidental poisoning in the United States, states Dr. Reginald S. Lourie, Chief of Pediatric Psychiatry at D.C. Children's Hospital. Although diet is not a contributing factor, incidence is higher in the low socioeconomic brackets (50 to 60 percent for children under age 6 as compared with 30 percent incidence in higher income groups).

(US DHEW PHS Public Health Reports 78(3): 272, March 1963)

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RESERVE**SECTION**Promotion of Officers

Inactive duty Naval Reserve Medical Corps officers selected for promotion to the grade of Captain by the selection board convened 26 February 1963:

Harry F. Bisel	Dean K. Brooks	Allan D. Callow
William F. Caveness	Curtiss Cummings	Everett M. Delabarre
Raleigh M. Hood	Charles H. Howarth	Winton H. Johnson
Clarence E. Keefer	John F. W. King	Kenneth P. Knudtson
Leon R. Lezer	Leon Littman	John F. Loughlin
Robert A. Love	Walter L. Mersheimer	Charles J. Molnar
Edward G. Nedwicki	Earl G. Padfield, Jr.	Robert W. Quinn
John B. Reddy	Robert L. Stone	Leon N. Sussman
Irvin H. Trinchler	Edward C. Weiford	William G. Wiest

Inactive duty Naval Reserve Medical Corps officers selected for promotion to the grade of Commander by the selection board convened 26 February 1963:

James M. Anthony	Paul M. Arnesen	William M. Berton
Benjy F. Brooks	Frank W. Bussard	John H. Caputi
James A. Duncan, Jr.	Henry H. Fetterman	David Gillette
John C. Glenn, Jr.	Paul F. Grice	Warren G. Hardy
Harold P. Hargreaves	James T. Helsper	Charles E. Herlihy
Waldo S. Holt	Thomas R. Hunter, Jr.	William S. Kiyasu
John H. Middelkamp	Stephen P. Murphy	Arthur R. Nelson
John C. O'Leary	Frederick A. Peirce	James C. Peterson
Richard J. Pollard	Charles J. Savarese	Cheves M. Smythe
Giuseppe Turchi	Robert R. Wadlund	Samuel A. Youngman

Inactive duty Naval Reserve Medical Service Corps officers selected for promotion to the grade of Captain by the selection board convened 26 February 1963:

Willis R. Boss	Roland Ellis Byrd	Miles B. Fisher
Herbert N. Gardner	Daniel E. Howell	Henry A. Imus
	Roy W. Jones	

Inactive duty Naval Reserve Nurse Corps officers selected for promotion to the grade of Commander by the selection board convened 26 February 1963:

Cathleen E. Carmody
Mary D. Shanks

Mary J. Gabig
Grace J. Matthews

Anne M. Weir

* * * * *

Naval Reserve Medical Officer (Ret.)
Expresses "Thanks" to the Navy

Following is the text of a letter to the Chief of Naval Personnel from a recently retired Naval Reserve medical officer. Because of the inspirational and encouraging spirit exemplified in this letter, the Chief of Naval Personnel forwarded it to the Chief, Bureau of Medicine and Surgery. The Bureau is proud to publish this letter and, further, to state that unqualified approval of this officer's request was recommended:

"1. In accordance with reference (a) this medical officer was transferred to the retired list on 1 September 1962, and wishes to express his thanks and appreciation to the Navy Department and others concerned for the opportunity, encouragement, and leadership which permitted this officer to serve his country. It has been a privilege and a pleasure which has enriched both his private and professional life.

"2. As this officer has derived so much pleasure from his association with the Naval Reserve, it is requested that I be allowed to continue to meet with -----, It is further requested that I be allowed to conduct physical examinations for-----, when such are required, and that I be allowed to enroll in Reserve Correspondence Courses as may be necessary to keep current on future developments in Navy medicine in order to be prepared to return to active duty should the need arise. All such participation is understood to be on a non-drill pay, no retirement point basis, but this service is offered in expression of thanks for prior Navy Reserve association."

* * * * *

Uniform Allowances
(concluded)

5. Active Duty or Active Duty for Training Requirement - Excluding all periods of active duty or active duty for training in excess of 90 consecutive days, a total of at least 28 days of active duty or active duty for training must be included within one or more of the 4 qualifying satisfactory years. An officer earning 4 satisfactory years which do not include the required active

or training duty, however, subsequently becomes entitled to the allowance on the date he completes 28 days active or training duty, provided the anniversary year during which the duty is performed is also a year of satisfactory service.

EXAMPLE 1. An officer initially appointed in the Naval Reserve on 8 July 1953 has an anniversary date of 8 July. He became entitled to an initial uniform allowance on 10 October 1953 upon completing 14 drills requiring the wearing of the uniform. He completes satisfactory years of service for the following anniversary years including at least 28 days active duty or active duty for training within any one or more of these years:

8 July 1953 to 7 July 1954

8 July 1954 to 7 July 1955

8 July 1955 to 7 July 1956

8 July 1956 to 7 July 1957

He thereby became entitled to a uniform maintenance allowance on 10 October 1957, four years after the date of his entitlement to the initial uniform allowance on 10 October 1953, provided the officer has continued to maintain membership in the Naval Reserve to that date. ... An officer who completes a period of 4 years of satisfactory service which commenced prior to the date of last entitlement to a uniform reimbursement or allowance may be paid the \$50 uniform maintenance allowance on the date of expiration of 4 years from the date of last entitlement. Payment need not be withheld until the completion of 4 years of satisfactory service earned subsequent to the date of last entitlement.

EXAMPLE 2. If the officer in example 1 had failed to complete a satisfactory year of service on 7 July 1957 for the anniversary year which began 8 July 1956, he would not have become eligible for a uniform maintenance allowance on 10 October 1957. If, however, he subsequently completed a satisfactory year of service on 7 July 1958 for the anniversary year beginning 8 July 1957, he would become entitled to a uniform maintenance allowance on 7 July 1958.

EXAMPLE 3. If the officer in example 1 subsequently completes satisfactory years of service for each of the following anniversary years, including at least 28 days active duty or active duty for training within any one or more of these years:

8 July 1957 to 7 July 1958

8 July 1958 to 7 July 1959

8 July 1959 to 7 July 1960

8 July 1960 to 7 July 1961

he would thereby become qualified, upon the completion of the anniversary year ending 7 July 1961, to a further entitlement to a uniform maintenance allowance on 10 October 1961, provided the officer has continued to maintain membership in the Naval Reserve to that date.

(5) Claims Procedure and Forms. Naval Reserve officers entitled to any of the uniform allowances cited in this article shall submit their claims, with the necessary substantiating documents, in accordance with the instructions

indicated in the table shown in Vol. 41(7): 39 of the Navy Medical News Letter. Supplies of all forms prescribed are available in the Forms and Publications Supply Stocking Points. Each Reserve officer shall obtain the necessary claim forms from his commanding officer, district commandant or the nearest Naval Reserve Activity.

Bureau of Naval Personnel Manual—Part H

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POSTAGE AND FEES PAID
NAVY DEPARTMENT

DEPARTMENT OF THE NAVY
U. S. NAVAL MEDICAL SCHOOL
NATIONAL NAVAL MEDICAL CENTER
BETHESDA 14, MARYLAND

OFFICIAL BUSINESS

Permit No. 1048